13. GEOGRAPHICAL VARIATION IN TOXICITY OF VENOM OF THE COBRA AND EXTRACTION BY VACUUM METHOD

Venom output studies are important to the Immunologist, the Clinician and the Biochemist. The first one requires more venom of sufficient toxicity for immunisation, the second one would like to know the quantity for neutralisation in treatment and third for experimentation. These records for some Indian snakes were completed for periodicity, differences in male and female and the output in farm and room (Deoras 1963, 1966). There are three varieties of Cobras showing different head markings. They are geographically separated. The monocellate is found in Bengal and Assam, and the Binocellate and Acellate in other parts of India. The differences in the toxicity of these three were not known. Secondly the vacuum method of extraction of venom had not been tried in India. This has been done for cobra, krait and Russel's Viper.

MATERIAL AND METHODS

In the routine method stainless steel funnel as used by Deoras (1963) was employed and the venom collected directly in the ampoule. This was deep-frozen and lyophilised and kept sealed under vacuum at –4°C. In the second method, a glass bottle was held by clamp. A thick plastic transparent sheet was firmly tied to the mouth by threads and elastic tape. A glass tubing with a thin point was inserted in one corner of the plastic cloth. The other end of the tubing was connected to a vacuum pump run on half horse power motor. Snake was made to bite the cloth and the vacuum started. Venom trickled in the bottle from the fangs.

The toxicity of the venom was worked out by I/V route in mice

OBSERVATIONS

Table No. 1 shows the maximum and minimum output of venom from the three mark-different varieties of cobra (*Naja naja*). The month at the base of the figures indicates the period of maximum and minimum output for each variety. The toxicity of the venom is highest in the monocellate cobra, though the maximum output is more in Acellate variety. Cobra is a powerful snake and after a bite it tries to move the fangs thus not only tearing the cloth but also nullyfying the vacuum. It is thus noted in Table No. 2 that there is no apparent difference in the output of venom in cobra snakes by the vacuum method and otherwise. The snake also exhibited convulsive movements after the vacuum operations.

TABLE 1

DIFFERENTIAL OUTPUT OF VENOM IN GM FROM THREE HOOD MARK VARIETIES OF COBRAS

Season	Month	(*Naja naja*) Binocellate	(*Naja naja oxiana*) Acellate	(*Naja naja kaouthia*) Monocellate
	1969			
	July	0.1116	0.4553	0.1824
Rainy	August	0.1479	0.1194	0.0423
	September	0.1314	0.2894	0.1981
	October	0.1511	0.2963	0.1481
	November	0.1096	0.2663	0.1660
Winter	December	0.1029	0.2807	0.1337
	1970			
	January	0.0875	0.1144	0.2272
Summer	February	0.0863	0.1238	0.1611
	Average:	0.1160	0.2432	0.1573

TOXICITY:

Binocellate (*Naja naja*)	8.87
Monocellate (*Naja naja kaouthia*)	8.055
Acellate (*Naja naja oxiana*)	19.57

TABLE 2

DIFFERENTIAL OUTPUT OF VENOM IN GM IN COBRAS WITH MODIFIED MILKING METHODS

Month 1969	Without vacuum		With vacuum	
	Male	Female	Male	Female
September	0.1518	0.1191	0.1438	0.1026
October	0.1838	0.0749	0.1356	0.0866
November	0.1552	0.0680	0.1097	0.0609
Average:	0.1636	0.0873	0.1297	0.0833

In the case of Krait (*Bungarus caeruleus*) the teeth being small and there being no further movements the vacuum method gave more amount of venom as shown in Table No. 3. The snake after the bite lifted the head releasing the grip as such it was easy to disentangle. There is no apparent difference in the toxicity of venom collected by the two methods as shown by Table 3.

TABLE 3

DIFFERENTIAL OUTPUT OF VENOM IN GM IN KRAITS WITH MODIFIED MILKING METHODS

Without vacuum 1968		With vacuum 1969		With vacuum 1970	
January	0.0097	April	0.0179	January	0.0115
February	0.0035	May	0.0236	February	0.0135
March	0.0047	June	0.0170	March	0.0172
April	0.0034	July	0.0210	April	0.0155
May	0.0148	August	0.0233	May	0.0231
November	0.0117	September	0.0207	June	0.0118
December	0.0064	October	0.0181	July	0.0139
1969					
January	0.0098	November	0.0178	August	0.0151
February	0.0076	December	0.0169	September	0.0167
March	0.0079			October	0.0141
				December	0.0133
Average	0.0080		0.0196		0.0150

DISCUSSION

Karlsson & Eaker (1971) have shown differences in the amino acid content of cobras collected from different geographical locations. Our findings give an answer to his observation. Cobra snakes having different markings are believed to be more toxic or otherwise. Our present findings show that the maximum output is given by the Acellate, but the toxicity is more in Monocellate cobras. These would help the clinicians to devise doses for curative purpose and the immunologist to incorporate all these three venoms as a pool to get good results in immunisation.

The vacuum method will now become a tool to collect more venom from Krait snakes, as this has been in short supply for some time.

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14. ON *PSILOCEPHALUS BARBATUS* (GRAY), AN INTERESTING BALISTOID FISH TRAWLED OFF GANJAM COAST, ORISSA

(*With a text-figure*)

Recently Shri S. K. Mohanty, Superintendent of Fisheries, Biological Research Station, Balugaon, Orissa, sent the senior author a specimen of *Psilocephalus barbatus* (Gray), trawled on 25.i.73, at 15 fathoms depth off Rushikulya river mouth, Ganjam Coast, Orissa. A search of the Zoological Survey of India fish reserve collections reveals that the fish is represented by a single specimen collected by F. Day from Madras coast. Day's (1878 : 694) description and figure of the species were based on this specimen. Regarding the habitat of the fish he stated that the fish occurs in the "Seas of India to the Malaya Archipelago. Is very common at Madras, especially the young. It attains at least 10 inches in length." There is, however, no record of this fish from the Indian seas subsequent to that of Day and the present record of it from Orissa coast is, therefore, of special significance.

We know next to nothing of the biology of *Psilocephalus barbatus* eventhough it is found in shallow waters and the young according to Day (op. cit.) is in abundance along the Madras coast. The presence of a long fleshy barbel below the symphysis of the lower jaw strongly indicates that the fish is bottom dwelling, but it will be interesting to investigate, with its elongated snout and upturned mouth with small incisiform teeth in the jaws, how the fish makes a living. The gut content examined in the specimen available to us is found to mainly consist of a mush of Polychaete worms.

P. barbatus is the only representative of the family Psilocephalidae of the superfamily Balistoidea of the suborder Balistoidei. There are two suborders of the order Tetraodontiformes (Plectognathi) namely, Balistoidei (Sclerodermi) with three superfamilies (Triacanthoidea, Balistoidea and Ostraciontoidea), and Tetraodontoidei with four superfamilies (Triodontoidea, Tetraodontoidea, Diodontoidea and Moloidea). The superfamily Balistoidea composed of the filefishes, triggerfishes